"Pizza"rama With Fractions!!

Brief Overview:

This unit focuses on student understanding of naming and comparing given fractions and finding the fractional of a set or regions. Students will also measure using their knowledge of fractions.

NCTM Content Standard/National Science Education Standard:

Read, write, and represent fractions as parts of a single region using symbols, words, and models.
Read, write, and represent fractions as parts of a set using symbols, words, and models.

Grade/Level:

Grade 3

Duration/Length:

4 lessons (including assessment); approximately 45-60 minutes in length per lesson

Student Outcomes:

Students will:

- **Understand the fractions halves, fourths, and eighths and then be able to order those fractions on a number line from zero to one.**

- **Identify the fractional part of a region.**
- **Measure fractional parts of different ingredients in a cooking activity.**

Materials and Resources:

- **Empty Pizza Box**
- **Teacher Preparation: Construction Paper Pizza (about the size of a large pizza!)**
- **Open Number Line (Masking Tape)**
- **Teacher Preparation: Pizza Fraction Pictures for Index Cards (Teacher Resources 1 and 2)**
- **Paper Plates**
- **Zip-loc Bags**
- **Student Resource 1 (Comparing Fractions Using Our Pizza)**
- **Teacher Resource 3 (Comparing Fractions Answer Key)**
- **Student Resource 2 (Pre-Assessment for Lesson 2)**
- **Teacher Resource 4 (Answer Key to Pre-Assessment for Lesson 2)**
- **Student-made Paper Plate Pizzas**
- **Transparent Tape**
- **Teacher Preparation: Pizza Toppings (Teacher Resource 5)**
- **Overhead Projector and Colored Counters**
- **Student Resource Sheet 3 (My Topping Fractions!)**
- **Measuring Cups that Measure $\frac{1}{4}$, $\frac{1}{2}$, and 1/8**
- **Beans for Measuring Activity**
- **English Muffins**
- **Pizza Sauce**
- **Mozzarella Cheese**
- **Pepperoni Slices**
- **Plastic Knives**
- **Student Resource 4 (Summative Assessment)**
- **Teacher Resource 6 (Summative Assessment Answer Key)**

Development/Procedures:

Lesson 1

Pre-Assessment

- **Students should already have a basic understanding of numerator and denominator and the idea of a fraction being part of a whole.**
- **Direct students to fold a sheet of paper into $\frac{1}{2}$, $\frac{1}{4}$, and 1/8.**
- **Assess students' ability to complete the task.**

Launch

- **Read the first 7 pages of Fraction Fun by David Alder.**
- **Present a large pizza box to the class and ask them to describe what is inside. How is pizza usually divided? Why is pizza usually divided?**
- **Explain to the students that in this lesson they are going to create their own pizza and divide it into halves, fourths, or eighths.**
- **Inform students they will be asked to discuss those fractions in relationship to each other.**

Teacher Facilitation

- **Present the concept of the relationship between halves, fourths, and eighths by showing the students a pizza box with a whole construction paper pizza inside.**
- **Ask a student to come to the front of the class and fold the paper pizza in half.**
- **Draw a dotted line on that fold.**
- **Ask another student to fold the paper pizza into fourths and draw a dotted line along that fold.**
- **Ask a final student to divide the paper pizza into eighths and draw dotted lines showing the eighths.**
- **Model given fractions such as $\frac{1}{2}$, $\frac{3}{4}$, 5/8, etc. by drawing circles on the board or overhead and shading in those fractions.**

- **Demonstrate that in fractions such as $\frac{1}{4}$, $\frac{1}{2}$, and 1/8, the pieces get smaller as the denominator gets larger.**
- **Distribute pizza fraction cards (Teacher Resource 1 or 2) to random students.**
- **Ask them to read their fraction aloud and place the fraction on an open number line from zero to one (masking tape on the classroom floor with a marked beginning, middle, and end).**

Student Application

- **Instruct students to color a paper plate decorating their pizza with sauce (red) and cheese (yellow).**
- **Divide the class into groups of 3.**
- **Encourage students to use a ruler to do the following cutting activities:**
  - Instruct one of the students in each group to cut their pizza into halves.
  - Instruct a second student in each group to cut their pizza into fourths.
  - Instruct the last student in each group to cut their pizza into eighths.
- **Guide students to use their pizza manipulatives to answer the questions on Student Resource 1. Answer key is on Teacher Resource 3.**
- **Distribute Zip-loc bags for students to place their pizza fraction pieces in for Lesson 2.**

Embedded Assessment

- **Assess student understanding by their ability to place their fraction in the correct place on the number line.**
- **Assess student understanding by their ability to compare and show the relationship between halves, fourths, and eighths (Student Resource 1).**

Reteaching/Extension

- **For those who have not completely understood the lesson, the teacher may work with small groups shading in different fractions of circles.**
- **For those who have understood the lesson, the teacher may make fraction cards with numbers instead of pictures and have them place those on the open number line.**

Lesson 2

Pre-Assessment

- **Have students identify fractional parts of a given set as they complete Student Resource 2. Answer key can be found on Teacher Resource 4.**

Launch

- **Tell the students that they are going to put their pizzas from Lesson 1 back together so we can add some toppings!**
- **Allow students to use transparent tape to tape their pieces back together to make one whole pizza.**
- **Inform the students that in this lesson they are going to add 10 topping pieces to their pizza and then identify the fraction of each topping on their pizza (their set).**

Teacher Facilitation

- **Refer back to Lesson 1 and explain that in that lesson, we were naming and comparing the size of the fractions for halves, fourths, and eighths.**
- **Introduce the idea of a fraction of a set by using colored counters on the overhead projector.**
- **Place ten counters, 4 of one color and 6 of the other on the overhead and first ask the students what the denominator of this set would be (10).**
- **Ask what fraction of the counters is one color and what fraction of the set is the other color.**

- **Model a few examples like this using the overhead.**
- **Place 10 counters of 4 different colors on the overhead and assign each color as a topping (red=pepperoni, orange=onions, white=mushrooms, brown= sausage).**
- **Ask what fraction of the set is each pizza topping.**

Student Application

- **Direct students to choose 10 topping pieces (Teacher Resource 5) to glue on their paper plate pizza from Lesson 1. For example, a student may choose 4 pepperoni pieces, 1 mushroom piece, 2 onion pieces, and 3 sausage pieces.**
- **Inform the students that they must choose at least 1 of each topping for their pizza.**
- **Guide students to complete Student Resource Sheet 3 writing their topping fractions from their pizza.**
- **Choose a student to display his/her pizza for the class.**
- **Read the fractions on the pizza and have the other students assess whether those fractions are correct by looking at the paper pizza with toppings.**

Embedded Assessment

- **Assess students by determining whether or not their fractions for their toppings match their pizza.**
- **Allow students to assess each other by using their pizza and fractions.**

Reteaching/Extension

- **For those who have not completely understood the lesson, they may use the counters on the overhead as manipulatives to show fractional parts of a given set.**
- **For those who have understood the lesson, the teacher may challenge them by having them add more toppings to their pizza and writing the fractional part of the set.**

Lesson 3

Pre-Assessment

- **Review skills practiced in Lessons 1 and 2.**
- **Use student pizzas to ask the following questions:**
- **Who can tell me which of these pizzas was cut into fourths?**
- **Who can tell me what fractional part of the pizza has sausage?**

Launch

- **Conduct a favorite pizza place survey.**
- **Ask students to vote for their favorite pizza place – Pizza Hut, Dominos, Papa Johns, etc.**
- **Use tally marks to collect and discuss the data.**
- **Tell the students that today they are going to make their own pizza using some things they've learned about fractions and using their measuring skills.**

Teacher Facilitation

- **Show students measuring cups that measure $\frac{1}{4}$, $\frac{1}{2}$, and 1/8.**
- **Use the cups to measure different amounts of beans.**
- **Ask a student to come to the front of the class and measure $\frac{1}{4}$ cup of beans.**
- **Ask another student to come to the front and measure 1/8 cup of beans.**
- **Ask another student to come to the front and measure $\frac{1}{2}$ cup of beans.**
- **Instruct students to put themselves in order from the smallest to greatest fraction.**
- **Vary this activity by doing it again with different fractions (Example: $\frac{3}{4}$ cup, 2/8 cup, 4/8 cup.)**

Student Application

- **Distribute an English muffin and a plastic knife to each student**

- **Instruct them to cut their English muffin into halves.**
- **Direct students to measure out one fourth of a cup of sauce for each half of their pizza.**
- **Direct students to measure a half cup of cheese for their pizza.**
- **Tell students they may choose to put 2 pepperonis on their pizza or they may just leave it plain.**
- **Divide class into groups of 5 so they can put their pizza on a pan to cook.**
- **Make a model on paper or the board of where students place their pizza on the pan to cook.**
- **Ask students to identify the fractional part of their groups 10 pizzas that have pepperoni and the fractional part that is just cheese.**
- **Cook pizzas and enjoy!**

Embedded Assessment

- **Assess student understanding of using fractions to measure by observing them make their pizza.**
- **Assess their ability to identify a fractional part of a set by their groups pan of pizzas.**

Reteaching/Extension

- **For those students who have not completely understood the lesson, partner them with a friend to help them measure ingredients for their pizza.**
- **For those students who have understood the lesson, challenge those by having them write word problems with fractions using their groups 10 pizzas.**

Summative Assessment:

- **Divide students into small groups of 4 or 5.**
- **Write the following questions on the board.**
    - **What fraction of your group are boys?**
    - **What fraction of your group are girls?**
    - **What fraction of your group wears glasses?**

- What fraction of your group has blonde hair?
- What fraction of your group has blue eyes?
- What fraction of your group has buttons on their shirt?

- **Distribute poster board and markers for groups to record answers.**
- **Students will then complete written assessment with BCR, Student Resource 4.**
- **See Answer Key on Teacher Resource 6.**

Appendix A:

- **Teacher Resource 1 – Pizza Fraction Circles for Index Cards**
- **Teacher Resource 2 – Pizza Fraction Circles for Index Cards**
- **Teacher Resource 3 – Comparing Fractions Answer Key**
- **Teacher Resource 4 – Pre-assessment for Fractions of a Set**
- **Teacher Resource 5 – Pizza Topping Pieces**
- **Teacher Resource 6 – Summative Assessment Answer Key**

Appendix B:

- **Student Resource 1 – Comparing Fractions Activity Sheet**
- **Student Resource 2 – Pre-assessment for Fractions of a Set**
- **Student Resource 3 – Pizza Toppings Activity Sheet**
- **Student Resource 4 – Summative Assessment**

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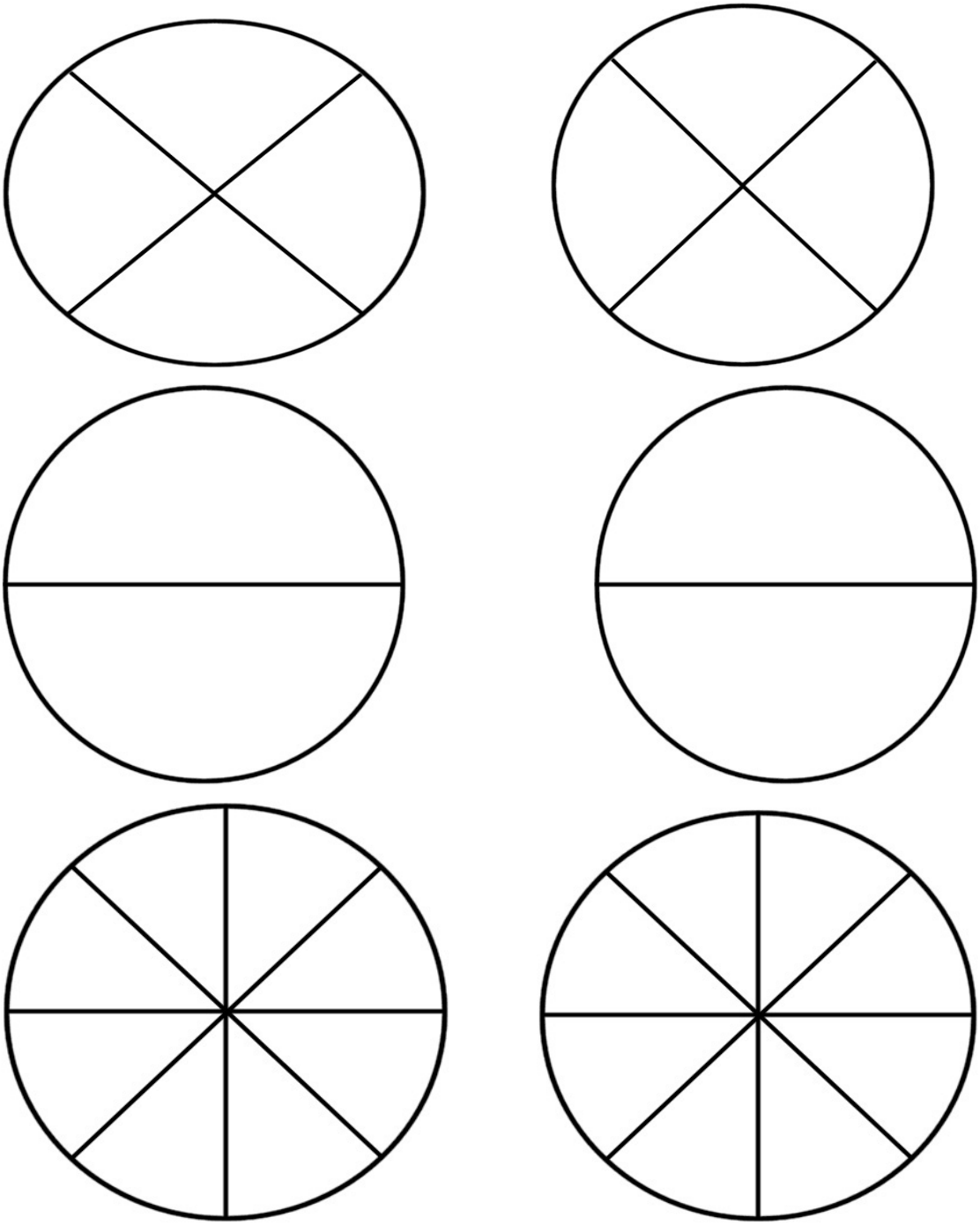
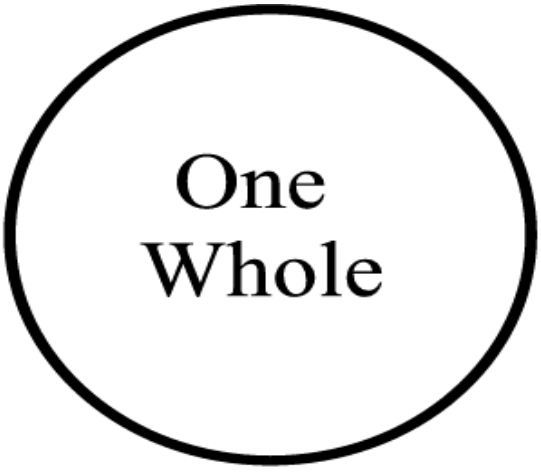
Teacher Resource 1

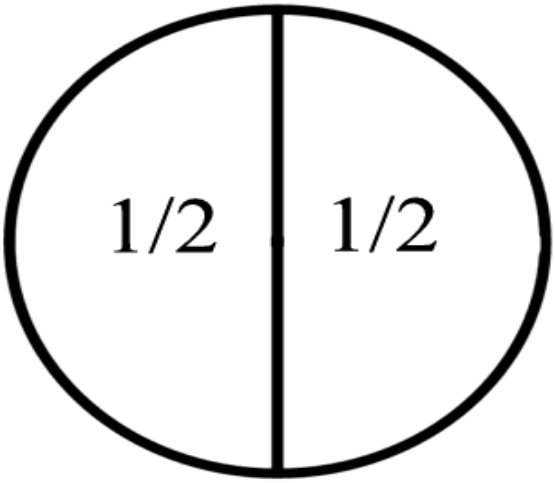
Directions: Shade circles with fractions of your choice. Glue circles to index cards for open number line activities.

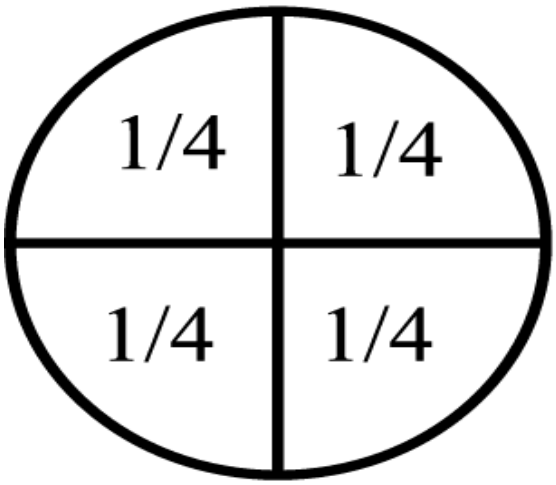


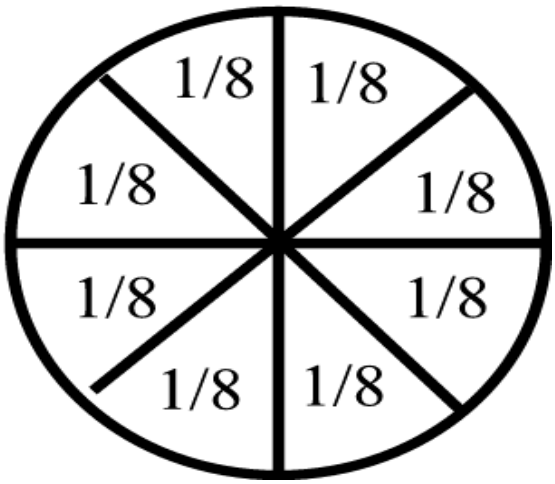
Teacher Resource 2

These cards may be used instead of cards on Teacher Resource 1.









Teacher Resource 3 - Answer Key

Directions: **Using your pizza pieces, fill in each number sentence with >, <, or =.**

$\frac{1}{2}$ **>** $\frac{1}{4}$

$\frac{2}{8}$ **<** $\frac{4}{8}$

$\frac{4}{4}$ **>** $\frac{7}{8}$

$\frac{4}{8}$ **=** $\frac{2}{4}$

one eighth < five eighths

three fourths > two fourths

one half > three eighths

Problem: **Jane, Joe, and Jennifer are splitting a large pizza that is divided into 8 equal pieces. Jennifer is the hungriest person, Joe is next, and Jane really isn't hungry at all. Based on this information, write a possible fraction that each person may eat. Explain your thinking and justify your answer with words. You may use the back of this sheet to show your work and answer.**

Answers will vary!

Teacher Resource 4

Pre-assessment: What fraction of each set are triangles?

1. Δ Δ Δ O O
O O O Δ O

$\frac{4}{10}$

2. Δ Δ O Δ O
O O O O O

$\frac{3}{10}$

3. O O Δ Δ O
O O O O O

$\frac{2}{10}$

4. O Δ O Δ O Δ
Δ Δ Δ O

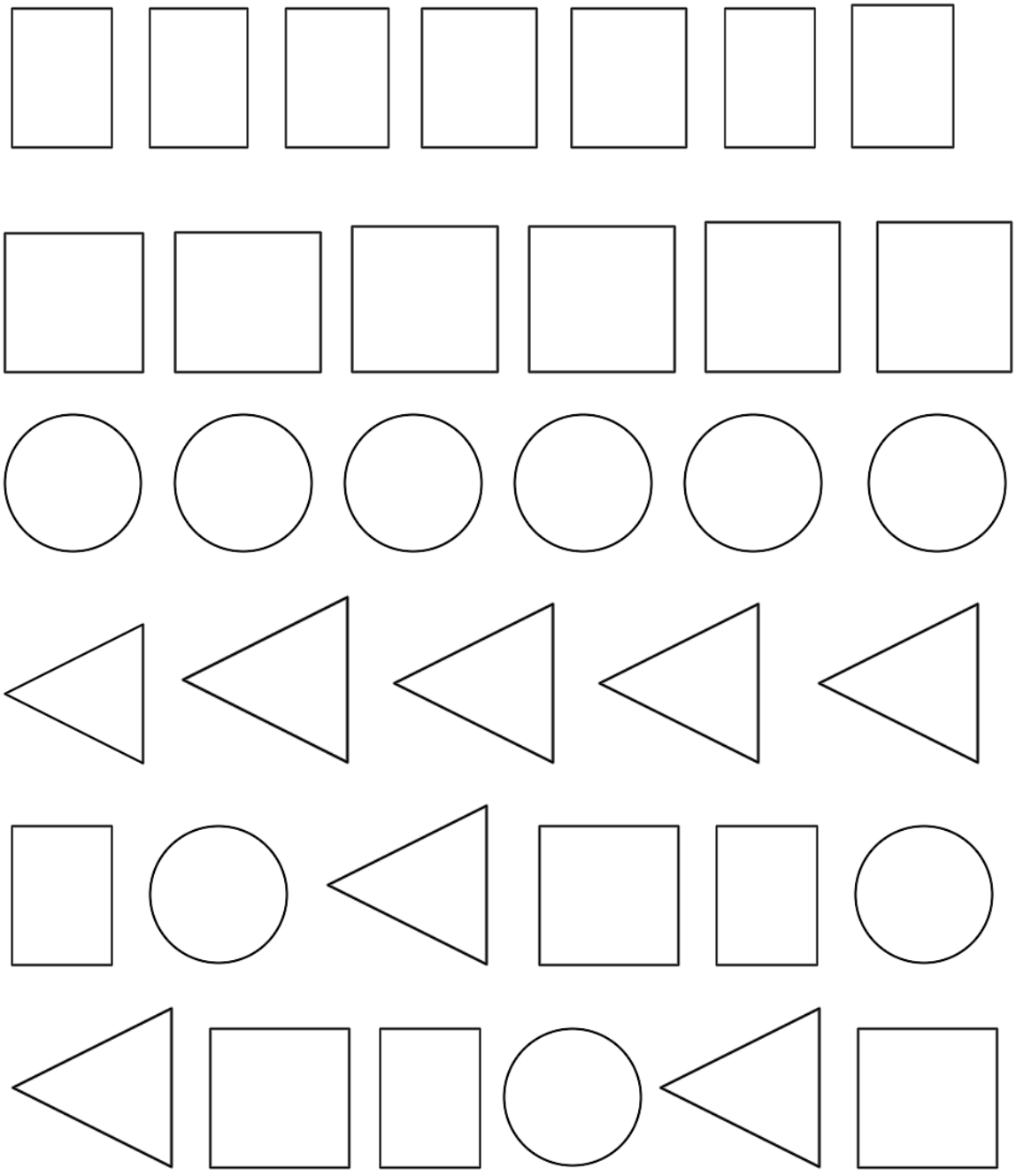
$\frac{6}{10}$

5. O Δ O Δ O
Δ Δ Δ Δ Δ

$\frac{7}{10}$

Teacher Resource 5

Pizza Topping Pieces- Teachers need to run copies of this and have this pre-cut for lesson 2.



Teacher Resource 6

Summative Assessment – Answer Key

Name _____ **Date** _____

Directions: Draw 3 circles. Divide one circle into halves, one circle into fourths, and one circle into eighths. Shade in a fraction for each circle and tell what fraction you have shaded in.

***Answers will vary after students have drawn 3 circles and chosen their fractions.**

Selected Response:
Which of the following fractional parts of a set is the greatest fraction?

A. $\frac{1}{4}$ **B.** $\frac{5}{8}$ **C.** $\frac{1}{2}$ D. $\frac{7}{8}$

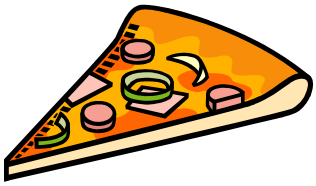
BCR:

Part A: Suppose we were having a pizza party at our school. Pizza Hut delivered 9 pizzas. Papa John's delivered 6 pizzas. Dominos delivered 4 pizzas. What fraction of pizzas did each pizza place deliver for our pizza party?

Pizza Hut	**Papa John's**	**Dominos**
$\frac{9}{19}$	$\frac{6}{19}$	$\frac{4}{19}$

Part B: Use what you know about fractions to explain why your answer is correct. Use pictures, numbers, and/or words in your answer.

***Answers will vary.**



Student Resource 1

Name _____

Directions: **Using your pizza pieces, fill in each number sentence with >, <, or =.**

$\frac{1}{2}$ $\frac{1}{4}$

$\frac{2}{8}$ $\frac{4}{8}$

$\frac{4}{4}$ $\frac{7}{8}$

$\frac{4}{8}$ $\frac{2}{4}$

one eighth **five eighths**

three fourths **two fourths**

one half **three eighths**

Problem**: Jane, Joe, and Jennifer are splitting a large pizza that is divided into 8 equal pieces. Jennifer is the hungriest person, Joe is next, and Jane really isn't hungry at all. Based on this information, write a possible fraction that each person may eat. Draw a picture showing your thinking. Explain your thinking and justify your answer with words. Use this sheet to show your work and answer.**

Student Resource 2

Name _____ **Date** _____

Pre-assessment: What fraction of each set are triangles?

1. Δ Δ Δ O O
O O O Δ O

_____

2. Δ Δ O Δ O
O O O O O

_____

3. O O Δ Δ O
O O O O O

_____

4. O Δ O Δ O Δ
Δ Δ Δ O

_____

5. O Δ O Δ O
Δ Δ Δ Δ Δ

_____

Name _____

First draw a picture of your pizza with your toppings!

Now write the fractional part of the set each for each of your pizza toppings.

Pepperoni (Circles) _____

Sausage (Squares) _____

Onions (Triangles) _____

Mushrooms (Rectangles) _____

Student Resource 4

Summative Assessment

Name _____ **Date** _____

Directions: Draw 3 circles. Divide one circle into halves, one circle into fourths, and one circle into eighths. Shade in a fraction for each circle and tell what fraction you have shaded in.

Selected Response:
Which of the following fractional parts of a set is the greatest fraction?

A. $\frac{1}{4}$ **B.** $\frac{5}{8}$ **C.** $\frac{1}{2}$ **D.** $\frac{7}{8}$

BCR:

Part A: Suppose we were having a pizza party at our school. Pizza Hut delivered 9 pizzas. Papa John's delivered 6 pizzas. Dominos delivered 4 pizzas. What fraction of pizzas did each pizza place deliver for our pizza party?

Pizza Hut _____ Papa John's _____ Dominos _____

Part B: Use what you know about fractions to explain why your answer is correct. Use pictures, numbers, and/or words in your answer.